University of Guelph
College of Engineering and Physical Science
Department of Mathematics and Statistics

STAT*6950 Statistical Methods for the Life Sciences

Fall 2019
Credit Weight: 0.5

CALENDAR DESCRIPTION: Analysis of variance, completely randomized, randomized complete block and latin square designs; planned and unplanned treatment comparisons; random and fixed effects; factorial treatment arrangements; simple and multiple linear regression; analysis of covariance with emphasis on the life sciences. STAT*6950 and STAT*6960 are intended for graduate students of other departments and may not normally be taken for credit by mathematics and statistics graduate students.

LECTURES: 1:00–2:20 Tuesday and Thursday in MINS 106.

INSTRUCTOR: Jeremy Balka x54481 OFFICE: 550 MacN EMAIL: jbalka@uoguelph.ca
OFFICE HOURS: Monday 1:00 – 3:00, Tuesday 3:00 – 4:00. I am also available at many other times, and depending on my schedule can accommodate drop-ins.

COURSE OBJECTIVES: Upon successful completion of the course, students will be able to:

- choose an appropriate statistical inference procedure in a variety of situations, carry out the procedure, and effectively communicate a proper interpretation of the results.
- design basic experiments and other research studies.
- discuss the advantages and disadvantages of various study designs.
- demonstrate an understanding of the limitations and uncertainties associated with statistical models.
- discuss the assumptions of statistical models, investigate these assumptions using appropriate plots and statistics, and discuss the implications of violations of those assumptions.
- discuss and critique statistical analyses and conclusions in published research papers.
- demonstrate competence in using statistical software to implement statistical procedures.

LEARNING RESOURCES: There is no official text for the course. I will supply notes as the semester progresses, and point to other resources. Some potentially useful resources:

- *The Statistical Sleuth*, 3rd ed., by Ramsey and Schaefer (Brooks/Cole, 2013). (A copy of this textbook will be available on reserve at the library.)
- *Regression Analysis by Example*, 4th ed., by Chatterjee and Hadi (Wiley, 2006). (Freely available electronically through the U of G library website.)
- *A First Course in Design and Analysis of Experiments*, by Oehlert (2012). (Licensed under Creative Commons and freely available.)
- For a refresher on topics in introductory statistics: *Introductory Statistics Explained*, by Balka (2015). (Freely available electronically through our Courselink site.)

GRADING SCHEME:

- Assignments: 40% There will be 4 equally-weighted assignments, with deadline dates:
  - Tuesday September 24.
  - Tuesday October 8.
  - Tuesday November 12.
  - Tuesday November 26.
- Midterm exam: 25%. During class time (1:00 – 2:20) on Tuesday October 29.
- Final exam: 35%. 19:00 – 21:00 December 13. Location TBA.

ASSIGNMENT AND EXAM POLICIES:

- **Any assignment not submitted by the deadline will not be marked and will receive a grade of 0.**
- While you are encouraged discuss approaches to assignment questions with other students, your submitted assignment must be your own work. Copying any part of another student's work is considered academic misconduct. (Please read the section on academic misconduct at the end of this document and in the graduate calendar.)
- The midterm and final exams will be open book.

POLICY FOR A MISSED MIDTERM EXAM: If you miss the midterm exam due to medical illness or another valid (and documented) reason, your final exam will be reweighted to make up for the missed exam.

STATISTICAL SOFTWARE: We will use R for our statistical analyses in this course. R is available in the computer pools on campus, and can be downloaded (for free) from https://www.r-project.org/.

HELP WITH R: There is no structured lab component to the course, but there is drop-in help with R available from 10:30 – 12:30 each weekday. Mondays it is in SSC 1306, Tuesdays through Friday it is in SSC 1305. At these times, the room is staffed by a Statistics graduate student who is there to provide help and guidance with R. It is used by several courses, and may be very busy from time to time during the semester.

COURSE WEBSITE: http://courselink.uoguelph.ca. Notes, announcements, assignments, etc. will be posted here.

University Policies

Email Communication
As per university regulations, all students are required to check their uoguelph.ca email account regularly: email is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement
When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, id, and email contact. See the academic calendar for information on regulations and procedures for Academic Consideration: https://www.uoguelph.ca/registrar/calendars/graduate/2018-2019/genreg/sec_d0e2502.shtml

Drop date
Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations

and procedures for course registration are available in the graduate calendar: https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml.

Copies of out-of-class assignments
Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility
The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact Student Accessibilities Services (SAS) as soon as possible.
For more information, contact SAS at 519-824-4120 ext. 56208 or email sas@uoguelph.ca or see the website: https://wellness.uoguelph.ca/accessibility/

Academic Misconduct
The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community, faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.
Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.
The Academic Misconduct Policy is detailed in the Graduate Calendar:
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e2635.shtml

Course Evaluation Information
The evaluation questions for the Department of Mathematics and Statistics can be found here: https://mathstat.uoguelph.ca/sites/uoguelph.ca.mathstat/files/public/TeachevaluationformW16_1.pdf

Recording of Materials
Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources
The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs: http://www.uoguelph.ca/registrar/calendars